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## Drivers and Interpretations of Doctoral Education Today: National Comparisons

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## Abstract

*In the last decade, doctoral education has undergone a sea change with several global trends increasingly apparent. Drivers of change include massification and professionalization of doctoral education and the introduction of quality assurance systems. The impact of these drivers, and the forms that they take, however, are dependent on doctoral education within a given national context. This paper is frontline in that it contributes to the literature on doctoral education by examining the ways in which these global trends and drivers are being taken up in policies and practices by various countries. We do so by comparing recent changes in each of the following countries: Canada, Colombia, Denmark, Finland, the UK, and the USA. Each country case is based on national education policies, policy reports on doctoral education (e.g., OECD and EU policy texts), and related materials. We use the same global drivers to examine educational policies of each country. However, depending each national context, these drivers are framed in considerably different ways. This raises questions about (1) their comparability at a global level and (2) the universality of the PhD. Also we find that this global-local nexus reveals unresolved tensions within the national doctoral educational frameworks.*

**Keywords:** doctoral education, higher education policy, massification, professionalization, quality assurance

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## 1. Introduction

Globally, research and researchers are viewed increasingly as critical to social and economic competitiveness and societal health (e.g., UK Council for Science and Technology, 2007; European Commission, 2014). It follows that over the past quarter of a century, the education of future researchers, principally through doctoral education, has become increasingly valued. As doctoral education shifts from the periphery (e.g., available to a small elite) to a more mainstream trajectory of the total educational experience, it is undergoing a sea change. Several global trends and related drivers of such changes can be identified. The forms that the drivers take, however, and their impacts, are dependent on the specific contexts of doctoral education in a given national context. Our paper contributes to the literature on doctoral education by examining the ways in which these global trends and drivers are being taken up in policies and practices by various countries. Depending on priorities, path dependencies, and openness to change, global trends play out in different ways in given countries. However, countries are also influenced by wider historical, economic, and cultural geositioning. In this paper, we highlight how drivers and trends have manifested themselves in individual countries. In a six country comparative case study – approach - Canada, Colombia, Denmark, Finland, the UK, and the USA – we address the following question: What recent changes related to doctoral education in relation to the three drivers and trends identified above can be identified in each country? To address this question, document based cases of doctoral education in each country are presented below. Particular attention has been paid to the identification of the most recent policy changes in doctoral education and the ways in which the changes are taken up. Drawing on our analysis of each context, we conclude by proposing future research agendas for examining doctoral education.

The case countries were selected because they present different cultural geositionings and traditions of doctoral education, ranging from the more structured and course work based model of the USA to the less structured model in Nordic countries. Also, the cases present variation in terms of the extent to which the higher education system in a given country is teaching-oriented, – for example, Colombia as a highly teaching-oriented system and Finland more research oriented – their emphasis on performance based management (e.g., the UK and USA presenting highly performance-based systems, Denmark, Finland and Canada being at the middle and Colombia being at the other end), and whether a country's higher education system is in the process of developing (Colombia), recently developed (Finland and Denmark) or well developed (Canada, USA & UK) (Shin, 2010; Shin & Jung, 2014). First, we begin with an overview of the key drivers, followed by country specific descriptions.

## 2. Global Drivers of Doctoral Education

Core global drivers affecting doctoral education have been identified in the research literature (e.g., Kehm, 2006) and in various policy reports (OECD, 2010; 2014; Department for Education and Skills, 2003). These trends include *massification* of doctoral education, *professionalization* of doctoral education and careers, and the development of various *quality assurance systems*.

### 1.1. Massification of Doctoral Education

Worldwide, the number of doctoral students and the number of doctoral degree holders has increased significantly. Since 2000, the proportion of those who have earned doctoral degrees has risen by 38% from 154,000 new graduates in 2000 to 213,000 new doctoral graduates in 2009 in OECD countries (Auriol, Misu & Freeman, 2013; OECD, 2014). On average in 2009, 1.6% of young people, compared to 1% in 2000, in OECD countries have earned doctoral degrees (OECD, 2014). Although graduation rates for women in 2012 (1.5%) at the doctoral level are still somewhat lower than those of men (1.7%), in several countries the expected proportion of women who are expected to graduate is larger based on increased number of women

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currently undertaking the doctoral studies (OECD, 2014). Massification of doctoral education has also increased researcher mobility. In 2010, worldwide about 3.6 million students were enrolled as international students in tertiary education (Auriol, Misu, & Freeman, 2013) and it is assumed that this number will continue to grow (Moguerou & Di Pietrogiacomo, 2008; & Rizen & Marconi, 2011). In addition to a highly educated work force, rapid increases in the number of doctoral degree holders have resulted in an unequal balance across disciplines. For instance, the number of doctoral degree holders in the majority of OECD countries is significantly higher in natural sciences than in humanities (OECD, 2014). Also, there is considerable variation in gender representation of doctoral degree holders across countries; as such, these figures mask substantial differences in the gender balance across different disciplines. At the PhD level, education, health, and welfare and the humanities continue to be female dominated; male PhDs are predominant in science, mathematics and computing, and particularly in engineering, manufacturing, and construction (OECD, 2012). There is some evidence that outside of academia, labour markets have not been able to fully absorb these highly qualified individuals Kehm (2006). In general, however, high employment rates between 93 to 99% have been reported among individuals possessing doctoral degrees. In most countries, employment rates of male doctoral degree holders slightly exceed those of females and male doctoral degree holders have higher earnings than their female counterparts (Auriol, Misu, & Freeman, 2013).

## 1.2. Professionalization of Doctoral Education

Considering the rise in the number of doctoral degree holders, it is evident that not all will be able to pursue careers in academia, nor should they be assumed to desire this. Based on a comparison of OECD countries, doctoral degree holders in the natural sciences and engineering are more likely to be engaged in research, while social scientists are likely to find more opportunities in non-research occupations (Auriol, Misu, & Freeman, 2013). Given that research skills are also now seen as being valuable to a broad range of employment sectors, a current driver is therefore the perceived need to better prepare doctoral students to work outside of academia through emphasizing more strongly the acquisition of “generic skills” in doctoral education (EUA, 2009; 2010; Fiske, 2011; Gilbert, Balatti, Turner & Whitehouse, 2004; OECD, 2012). Doctoral degree holders are considered to have the potential to contribute to economic growth, advancement, and diffusion of knowledge and technologies, and to solve societal and environmental problems (Auriol, Schaaper & Felix, 2012). Research, particularly in engineering, sciences, and medicine, is expected to result in innovations that will increase national competitiveness. Also, researchers are expected to participate in turning scientific discoveries into patents and innovations. Hence, fostering an entrepreneurial culture by instilling the skills and attitudes needed for creative enterprises is suggested to be a central part of 21<sup>st</sup> century researcher competence (OECD, 2010). This is driven by (1) an increased number of doctoral students, (2) an agenda to create “free flow of knowledge,” (3) accountability demands, such as reducing the time spent earning the degree, and (4) the goal of lowering levels of attrition among doctoral students. For instance, in Europe the Berlin Communiqué, 2003 and Bucharest Communiqué, 2012 have espoused professionalization of doctoral education including emphasising learning generic skills. Yet, a comparison of 19 OECD countries shows that government policies typically emphasise general researcher development, employability of researchers in academia, and improving research work rather than explicitly transferable skills in doctoral education (OECD, 2012). Somewhat paradoxically, this agenda sits alongside a perceived need to develop more comparable and structured doctoral programs, which suggests increasing standardisation and routinisation of programs of study.

## 1.3. Quality Assurance

In knowledge-based economies, knowledge production has become a commoditized and strategic resource (Fernandez-Zubieta & Guy, 2010; Kehm, 2006). The impact of global competition has resulted in a greater emphasis on evaluating the quality of research (Adras 2011). Frequent evaluation is seen as a means to meet the demands of greater transparency to the public and accountability of research organizations

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(Edler, Georhiou, Blind & Uyrre 2012). Many western countries have adopted higher education policies such as systematic benchmarking and research evaluation of universities, including doctoral education, as a means of quality assurance (e.g. Buela-Casal, Gutierrez-Matinez, Bermudez-Sanchez & Vadillo-Munzo 2007). Principal methods used in quality assurance are peer review, high volume bibliometric data (Geuna & Martin 2003), or a combination of these methods (e.g., informed peer review). Quality assurance has resulted in the burgeoning of global ranking schemes that have contributed to the intensification of institutional hierarchies. Also, the role of strategic alliances and competitive advantages – among market areas, countries, universities, and even individuals – has become an increasingly important asset in research. As knowledge producers, doctoral students are recognized as increasingly important societal and economic assets. A downside of this is that practices such as poaching highly qualified people who travel abroad from developing countries to earn doctoral credentials is on the increase (Auriol, Schaaper & Felix, 2012; OECD, 2014).

### 3. Research Design

The paper focuses on the exploration of global drivers of doctoral education and their local manifestation by using a comparative case study strategy (Yin, 2012). Each country case is based on national education policies, policy reports on doctoral education (e.g., OECD and EU policy texts), and related materials. Based on similarities and differences in terms of recent changes in the area of doctoral education in each country (Hsieh & Shannon, 2005), changes related to massification, professionalization and quality assurance were most frequently reported. Accordingly, our comparison focuses on addressing these three trends.

### 4. Country Cases

Each country invoked different ways in which trends have unfolded. Hence, each country case was analysed according to its most predominant trends. To provide readers a systematic overview, we conclude this analysis by summarising the findings in Table 1.

#### 4.1. Canada

In recent years, it has been recognized that Canada needs more individuals educated at the PhD level. According to the Conference Board of Canada (2014), “highly skilled people [i.e., PhD graduates] are key to the creation, commercialization, and diffusion of innovation” (p. 1). Yet, since 1998, Canada has earned a “D” in the multi-country rankings of PhD graduates. In 2010, Canada was ranked 15<sup>th</sup> out of 16 in terms of numbers of graduated PhDs. This suggests the need toward, rather than away from *massification* of doctoral programs and graduates. However, coordinated efforts to change the course of PhD education are difficult because of Canada’s decentralized education system. In terms of PhD studies, responsibility for education – including higher education – rests with the provinces,. The primary influence of the federal government on increasing the number of PhD graduates is through the awarding of doctoral scholarships. Regarding PhD funding, rather than providing moderate scholarships to many students, currently the trend is to award a select few with “winner take all” super-scholarships (Frank, 1999; Tamburri, 2013) The federal government has moved away from a more equitable playing field to one of promoting academic “stars” housed in institutions of “excellence,” which seems to be at odds with the goal of increasing the number of PhD graduates. Other types of funding, for example, by the universities themselves (e.g., through teaching assistantships) and faculty research grants, are not guaranteed and are disproportionately available across

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disciplines. Hence, some students may spend their entire doctoral careers with little or no financial support.

Several drivers for the need to re-imagine the PhD can be found in both policy documents and in the academic literature, including lengthy time to completion, limited or uneven funding opportunities, disappointing completion rates, allegedly antiquated forms of assessment (i.e., the traditional doctoral dissertation), oversupply in some disciplines, demand for skilled workers – highly qualified personnel (HQP) – in a knowledge society, and a poor employment outlook within academia (Elgar, 2003; Institute for the Public Life of Arts and Ideas, 2013, Tamburri, 2013). However, the demand for highly qualified personnel could be argued to be the strongest driver of change. The policy headlights appear to be aimed most strongly on changes that will produce labour market-ready workers – in other words, *professionalisation* of the PhD – who will be employed outside of the tenure track framework. However, the discourse around preparation for the labour force and related “skill” acquisition is rather messy and often contradictory. Labour market-ready skills can include critical thinking, creativity, and effective communication skills. Others believe that internships, professional development programs, partnerships with businesses and industry external to the university are needed to expand the skill repertoires of PhD students. One recent report that emerged out of a re-imagining exercise, provided the following criticism: “Rather than simply supplementing the student experience with additional opportunities, doctoral programs need to re-think their pedagogical aims and methods at the most fundamental level” (UBC Graduate and Postdoctoral Studies, 2014). However, the absence of national *quality assurance* mechanisms beyond implicit checks and balances within and among universities (e.g., comprehensive examinations, examination of the dissertation by external assessors) create challenges for re-imagining exercises.

In terms of *massification* of the PhD within the Canadian context, it is paradoxical that (1) more PhD graduates are required; (2) scholarships are awarded to a small proportion of PhD students; and (3) there appears to be a glut of PhDs in terms of employability within academia. Hence, the re-imagining process will be a long and contentious process in Canada. Time will tell whether re-imagining the PhD as just-in-time training for the workforce can in any way successfully supplant previous educational ideals such as Newman’s notion of education as an end in itself or Humboldt’s conceptualization of *Bildung* – that is, cultivation of the entire individual.

## 4.2. Colombia

In the 1990s, with the introduction of Law 30 (General Law of Education, 1994), Colombia experienced the second highest increase of Latin American countries, at 150%, in university (undergraduate and graduate) attendance. However, this increase lagged behind the mean achieved by OECD countries in the same period of time; only 6% of the population in Colombia continued their studies and entered to PhD programs.

In the 1960s and 1970s, the need to promote doctoral studies was identified and one of the first attempts of the government to ameliorate the problem took place in 1968 with the creation of the National Institute to Promote Science and Technology (COLCIENCIAS). Additionally, to encourage high *quality assurance* of future PhD candidates from that time onward, the National Ministry of Education (República de Colombia, Ministerio de Educación Nacional, 2010) invested large amounts of money to train Colombian doctoral students abroad. However, as in other countries, such a mobility policy generated considerable “brain drain” and most students remained in their host countries because of better professional opportunities.

Massification of doctoral programs has occurred in many developed countries. However, this was not the case in Colombia as *national* doctorate programs only began to appear some decades ago. Thus, between 1986 and 1990, only nine programs were in existence; between 1997 and 2001 this increased to 14 doctoral programs (National Council of Accreditation CNA, 2010). During that time only 2% of university professors held doctoral degrees. In the year 2001 for instance, only 26 individuals had completed doctoral degrees in Colombian universities; that is, a very low rate of only four graduates per 1,000,000 people. The World Bank (2003) predicted that globalization and economic growth policies would positively affect growth, professionalization, and the development of tertiary education in Colombia during 2001 and would

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lead to a greater number of people graduating with PhDs. In 2008, around 100 people had graduated from doctoral programs. Today, there are 92 doctoral programs in Colombia officially reported by the National Council of Accreditation, CNA (National System of Innovation in Higher Education; 2008; UNESCO-IBE, 2011), with more in natural sciences and mathematics, social sciences, education, and humanities than in engineering, health sciences, and economics (Jaramillo, 2009). Of these, 52% of doctoral programs are offered by private institutions.

Hence, doctoral studies are still available only for a small elite and the low availability of doctoral programs in some areas has led some professionals to choose a doctorate not with the goal of mastering an area related to their own field, but only in order to gain access to good jobs. Additionally, there is a lack of employment opportunities after graduation because funds provided by government for financing state universities and the opening of places for full-time faculty are not enough to meet national demand.

To assure the quality of programs, the government has adopted strategies such as creating and designing regulations (curricular, administrative and academic) and regulatory institutions (CESU, SNIES, CNDM, CNA, ICFES, among others). However, with so many institutions assigned to assure quality, overlap of functions has the potential to interfere negatively with the flow and development of doctoral programs which differ a great deal from one another (Brunner, 2001). All of the work undertaken regarding Colombian doctorate education has led to gradual and positive academic development. However, tensions regarding the existing dichotomy between promoting the creation of more doctorates while not addressing the parallel necessity of creating opportunities for employment of alumni exist. The other tension has to do with giving more importance to the regulation of programs rather than for the preparation of academic communities to develop new ways to teach and conduct research.

### 4.3. Denmark

In response to the rapid increase in doctoral students at Danish universities during the 1990s, Denmark created its first graduate schools in 1996. The University Act of 2007 required the establishment of graduate schools at all Danish universities. The purpose of mandatory graduate schools was to enhance the quality of doctoral education, including optimizing completion rates and standardizing doctoral education across universities (Danish Ministry of Higher Education and Science, 2014). With the Finance Act of 2005 and the Globalization Agreement of 2006, the Danish government decided to double the annual enrollment rate of doctoral students from 1,200 in 2003 to 2,400 in 2010. Since then, universities have maintained high enrollment rates and today around 2,400 doctoral students are enrolled annually (Danish Ministry of Higher Education & Science 2015a).

The development of doctoral education in Denmark is part of a wider European trend of more closely aligning research and doctoral education at the local universities with national and international “policy making and regulation through qualifications framework, benchmarking and evaluation” (Fortes, Kehm, & Mayekiso, 2014, p. 100). Together with most of the Nordic countries, doctoral education in Denmark has been reformed recently “involving a clear trend towards programmed teaching (a more heavy reliance on generic PhD courses for example,) and all of the countries are participating in the Bologna process for the creation of EHEA, The European Higher Education Area” (Gudmundsson, 2008, p. 86), which is a body “meant to ensure more comparable, compatible, and coherent systems of higher education in Europe” (European Higher Education Area, 2015). As Fortes, Kehm and Mayekiso (2014) point out, the tendency towards increase in “quality assurance at the European level should not be underestimated” (p.100) in terms of the fact that policy making at the European level highly influences and informs national policies on doctoral education in Denmark. Fortes, Kehm and Mayekiso highlight that despite the fact that the locus of doctoral education and its curricular content is a national issue, the European Commission “acts as a true policy entrepreneur” (p. 100) by specifying agendas and encouraging regulation at the European level. In Denmark, the Ministry urges universities to ensure that their doctoral programs promote interdisciplinary training and the development of transferrable skills, thus meeting the needs of the wider employment market (Gudmundsson, 2008, p. 77). However, at the same time the Ministry states that “[o]verregulation of

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The Danish Ministry of Higher Education and Science foregrounds the importance of the European Qualifications Framework (EQF) and the discourse of lifelong learning with the aim to align the quality and level of doctoral education internationally (Danish Ministry of Higher Education & Science 2015b). With the EQF, it is possible to compare educational systems, increase mobility across borders, and more fully to internationalize Danish universities. This can be said to increase competition among universities, which is seen in the benchmarking systems and the global ranking systems in relation to which the Danish universities navigate. The EQF's effect on doctoral education in Denmark has been to promote formalised generic skills and competences within research, development, and teaching at universities. The goals advanced by the Ministry focus on “better quality and better cohesion in higher education; even more quality and relevance in research; increased use and dissemination of knowledge and technology; improve[ment] of internationalisation of higher education, research and innovation; increased innovation in businesses, public institutions and higher education, and effective administration of education support and grants” (European Commission, 2014). This development points to some potential tensions including a dual focus on wider employment for the market *and* development of deep research skills necessary for academic environments specifically, together with an increased focus on internationalization and mobility *and* while attempting to build strong research environments at home universities in Denmark. Also, the dual goal of increasing training programs and support systems to anchor doctoral education more closely to the home institutional structure *and* the wish to enhance mobility and independence of individual doctoral students creates another tension.

Massification of doctoral education has been driven by the needs of a knowledge economy and national innovation policy and has been promoted systematically by the Ministry of Education and Culture (MEC) that provides the primary source of funding for the universities in Finland. Accordingly, between the 1990s and 2010 the number of doctoral degrees completed annually tripled. Currently, about 1600 doctoral degrees are awarded annually. The number of degrees completed yearly is highest in medicine, natural, and technical sciences. Although half of doctoral degrees are awarded to women, there are still some gendered disciplinary differences (Auriol, Misu & Freeman, 2013; KOTA-National Data Base, 2009; Puhakka & Rautapuro, 2013). Doctoral education has become more mainstream and at the same time researcher mobility has become increasingly important in national doctoral education policy. One result is an increased number of international doctoral students. To promote this inflow, the MEC provides financial support to universities to attract international doctoral students earning their degrees in Finland. However, the proportion of foreigners in doctoral training is still relatively low (14.8%). Also, the outflow of Finnish doctoral students is slightly higher than the inflow of international doctoral students studying in Finland (Garam, 2013).

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doctoral fellow that paves the way for becoming an independent researcher, and finally professorships and research directorships in the final stage) has been introduced (Academy of Finland, 2010). Also, a tenure track system that aims to promote the shift between stages three and four has been introduced. The employment rate of the doctoral degree holders is extremely high 97.6% (Treuthardt, & Nuutinen, 2012) and the majority (about 80%) work at the universities or research institutions in Finland (Sainio, 2010; The Graduate School Working Group, 2012). This may explain why, despite the emphasis on learning transferable skills in doctoral education policy documents (Academy of Finland, 2010; OECD, 2012), efforts to ensure and support work/life relevance have still remained somewhat minor at universities (Niemi et al, 2011).

The Bologna process and adaptation to the European Qualifications Framework (EQF) to increase the potential to promote international mobility and to facilitate equal participation in European doctoral programs (Berlin Communiqué, 2003; Bucharest Communiqué, 2012; European Commission, 2014) has resulted in the enhancement of quality assurance in Finnish doctoral education (The Graduate School Working Group, 2012) and engagement in international benchmarking and global ranking systems. Quality assurance developments have included setting the target doctoral completion time at four years of full-time study; however, time to graduation has remained almost unchanged at six to seven years (Sainio, 2010). Also, launching the Finnish Higher Education Evaluation Council that carries out audits of quality systems of the universities and assists universities in thematic and research evaluations, including doctoral education, is another development.

#### 4.5. United Kingdom

Even before its inclusion in the Bologna qualifications framework, UK doctoral education had emerged as an area of some interest to policy makers. This phenomenon can be related to the growing significance attached to the knowledge economy and to doctoral education as a training ground for professional researchers, both within and outside of the academy. Although the data presented by the UK's Higher Education Statistics Agency (HESA) on students and qualifiers (Higher Education Statistics Agency (n.d.) suggests that the number of doctoral graduates in the UK has tripled from 7,000 in 1994-5 to 22,000 in 2012-13, early concerns emerged during this period (e.g. Harris, 1996; National Committee of Inquiry into Higher Education, 1997) about whether doctoral education was producing the highly skilled knowledge workers required by the knowledge economy, particularly in science, technology, engineering, mathematics, and medicine, that is, the so-called STEMM subjects. Doctoral education was considered to be over-specialised and not providing training in generic skills relevant to industry and commerce. In addition to questions about whether its assessment mode (a doctoral thesis judged in a *viva voce* examination) was fair (Morley 2004; Morley et al, 2002) but also appropriate (Park, 2007), given the wider range of skills acquisition expected within the doctorate, other concerns included low and lengthy completion rates, low numbers entering STEMM subjects, and gender biases in these disciplines (Harris, 1996; Institute of Employment Research, 2003).

A key concern during this period has therefore been to intensify quality assurance of doctoral education. Quality Assurance Agency for Higher Education, QAA (2004) introduced national guidelines regarding the frequency of doctoral supervision meetings, who can be a doctoral supervisor, the monitoring of student progress (overlapping uncomfortably with immigration-related monitoring of international students), and use of completion rates as a quality assurance measure. New institutional roles and practices (e.g., specialist consultants, specialized software for institutional monitoring of doctoral education, and new academic specialisations such as doctoral pedagogy) have evolved in response to these regulatory demands.

UK doctoral education has also seen a strong emphasis on researcher training, framed in a discourse of individual skills and competences. A review by Roberts (2002) was largely prompted by concerns about the supply of scientists and engineers and found that the PhD provided “inadequate training – particularly in the more transferable skills” (p.10). Having been constituted in 2005 to evaluate the impact of the “Roberts” funding stream that was then created to support such training, the Sector Working Group on the Evaluation

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of Skills Development of Early Career Researchers, known as the “Rugby Team” also promulgated the concept of “early career researcher” (ECR), defined as encompassing the first 10 years of a researcher’s postgraduate career (Rugby Team, 2006). Their work also informed the constitution of Vitae, a nationally-funded body that promotes but also shapes UK researcher training through instruments such as its “Researcher Development Framework” (RDF) (Vitae, 2010), a text that continues to reflect the language of skills and competences. Vitae is now promoting its RDF to European audiences and more widely, projecting the UK as a leader in doctoral education provision. Maintaining a high level of international postgraduate admissions (currently around one third of the annual intake) is a further important priority for HEIs (Universities UK, 2014).

UK Research Council support for doctoral research has also become more focused. Whereas in the past, applicants from a wide range of universities could apply for doctoral studentships, these are now awarded through a national network of “Doctoral Training Centres (DTCs),” accredited by the Research Councils to award “MRes” degrees (a structured Masters’ degree devoted to research methods). In the social sciences, there are only 21 DTCs, so many universities (particularly “newer” universities) are excluded from accessing these studentships. This raises potential equity questions which require further research, as does the intensification of a research “training” agenda that aspires to incorporate a wider range of skills, but within a timeframe whose boundaries are more firmly regulated.

#### 4.6. United States

With greater numbers pursuing doctorates than ever before, the notion of a traditional research PhD is expanding. The federal Survey of Earned Doctorates (SED) reported that there were 52,760 earned research doctorates (PhDs) awarded from 421 doctoral granting institutions in 2013. This represents a 3.5% increase from 2012; in 2012 the rate had increased 4.2% from the previous year. Fifty-eight percent of earned doctorates were in science and engineering, with the remainder being in the social sciences, humanities, and education (National Science Foundation, 2014). With these increases, fields such as the humanities continue to produce more doctorates than can be absorbed by available research careers (June, 2014; Lederman, 2014). Also, these figures mask the growth of professional or practice doctorates, including the EdD (education, including educational administration), PsyD (psychology), or DM (management). This double growth in doctorates exemplifies a massification of the credential, typified in disciplinary areas that require individuals to have doctoral credentials. This suggests an inflation of educational requirements with questionable value or unjustified educational costs, commonly without their mapping on to a societal or personal return on investment.

Although most formal educational institutions expect their researchers to have earned PhDs, it is not universally mandated. Disciplinary bodies are beginning to acknowledge that the status quo of research doctorates solely for the purpose of preparing learners to continue on to academic rather non-academic careers is problematic (Neem, 2014). For example, the American Historical Association is seeking to broaden career options for those who will not be able to obtain academic positions; academic positions will eventually be one of only several potential career opportunities or directions (Grafton & Grossman, 2011; Jaschik, 2014). The 2014 report of the Modern Language Association has as its first recommendation the need to redesign doctoral programs away from only academic careers. The goal of the MLA is to “align [careers] with the learning needs and career goals of current and future students and to bring degree requirements in line with the ever evolving character of our fields” (MLA Task Force on Doctoral Study in Modern Language and Literature, 2014, p. 13). This is increasingly addressed by university career placement offices that help research students find positions outside academia (Patel, 2015).

Lacking a central oversight body, doctoral regulations regarding program content, degree specifics, and university requirements are guided by 37,000 combinations of institutional, disciplinary, state, or national accreditation criteria (U.S. Department of Education Office of Postsecondary Education (OPE), n.d.). Related to the number of disciplinary certification bodies and proprietary information among programs, it is difficult at best to try to compare data across programs and degrees to determine successful

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outcomes, speak to activities of early career researchers, or even track career paths (National Science Foundation, n.d.; Sinche, 2014). With ambiguous quality assurance, it should not be surprising that there is nearly a 50% rate of doctoral attrition, including those in a limbo of decade-long ABD (all but dissertation / defended) student status (Yesko, 2014). Given that less than 30% of U.S. faculty now work with tenure or are full-time on a tenure track (MLA Task Force on Doctoral Study in Modern Language and Literature, 2014), the growing population of casual and adjunct instructors, specifically those with doctoral degrees, will further invite investigation over educational quality. Endemic challenges of fairness in pay and labour related to the increase of faculty in temporary or contract positions result in time spent ensuring future teaching contracts rather than engaging in research or university / disciplinary service. Given the pragmatic nature of American doctoral training, current efforts focused on saving money through defunding education while eliminating full-time permanent faculty by relying increasingly on contingent labour point to a challenging future.

## 5. Discussion

From the individual country cases we have revealed three main issues: (1) what is happening on the ground? (2) the consequences of an increased formalization of doctoral education, and (3) the global-local nexus.

### 5.1. What is Happening on the Ground?

In keeping with our recognition of the necessary recontextualisation of any policy narrative, our comparative study points to the need to examine more fully “what is happening on the ground” in order to understand more adequately how the different global trends play out in the institutional environments in specific countries. Our comparative analysis demonstrates that the links between global (international) and local (national, institutional) levels of doctoral education are not similar across countries. Even though the countries considered in this paper do subscribe to the same global trends on the policy level, there are many differences on the national and institutional levels. This, we argue, makes comparisons among systems of doctoral education at the global level difficult and fraught with uncertainties and potential inequalities. More research should be undertaken into unlocking the potential for understanding more fully the diverse and complex nature of doctoral educational practice worldwide. To fully understand the character and consequences of global trends within doctoral education, one needs to take into account the level of integration that always takes place at the local level. Not only do countries differ when it comes to interpreting and understanding the meaning and relevance of global drivers such as massification, professionalization, and quality assurance within doctoral education, but individual institutions (universities) also face the task of integrating the global drivers into their own specific educational contexts and frameworks.

### 5.2. Formalization of Doctoral Education

As seen across the different country cases, even though there is a tendency to increase the numbers of doctoral programs, at the same time the aim is to consolidate them within doctoral “schools” and to enlarge the size of graduate schools within their institutions – hereby also increasing the level of formal training expected within doctoral education. The first issue relates back to the global trends of massification and quality assurance, while the latter issue is linked to the global trend of professionalization of doctoral education. As visible in the country cases, as the number of doctoral students have increased over the years, this has been met with the response of structuring doctoral education more “tightly” organisationally and demanding more formal procedures for how to develop and evaluate the performance done both by doctoral

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students and their supervisors. This has been described as the development of a generic doctoral curriculum (Green 2009) and a “transdisciplinary doctorate” (Willetts, Mitcell, Abeysuriya, & Fam, 2012) which is promoted in order to ensure educational relevance for the job market and to safeguard the quality of doctoral education globally. The aim of foregrounding and developing the generic dimension of the PhD across disciplines creates tension in relation to the desire to at the same time strengthen research environments at the disciplinary level, to maintain the strong disciplinary focus of the PhD, and to resist its over-regulation (Gudmundsson 2008).

### 5.3. The Global-Local Nexus

Despite presenting country cases at the level of global drivers of doctoral education, we are aware that even if similarities exist at the level of policy, how these policies play out at local levels will always involve a process of recontextualization (Bernstein, 2001). During our discussion of the meaning of the global drivers seen from individual national perspectives, it becomes apparent that although some of the same discourses and semantics are being used across different countries, the national, or local, meanings vary greatly. In addition to the shifts which recontextualisation necessarily involves, other factors which come into play include the size of the universities, the variation of gender, ethnicity, and age in student population, and the underlying political-economic conditions in each country. In a similar vein, Teichler (2004) has pointed to the fact that “nations and strategic policies of national governments continue to play a major role in setting the frames for international communication, cooperation and mobility as well as for international competition. Therefore, the frequent use of the term ‘globalization’ might be based on misunderstandings” (21). For example, this is specifically seen in the variation across countries regarding the meaning and management of “massification.” In some countries, massification seems to imply that the specific country “opens up the gate” with the simple aim of increasing the total number of people with PhD credentials, as in the cases of Colombia, Denmark and Finland. However, we see in the cases of Canada, USA and the UK that massification is also about generating hierarchies within the doctoral system itself – creating a difference between the so called elite- and super-scholarship holders and the rest, thus pointing to equity issues within the PhD system, which needs further scrutinizing. This calls for further research into what we call the “global-local nexus” of doctoral education. This nexus can be seen in several of the country cases where goals of increased internationalization of the doctorate and enhancing mobility among universities on a global scale stand alongside goals of strengthening research environments at the home institutions and the desire to allocate resources to enhance doctoral learning environments. Also, this affects the very nature of the PhD degree. Originating as a universal degree with universal credentials, the increasing focus on internationalization and mobility paradoxically makes visible how diverse, complex, and in some cases incomparable, the PhD degree has become. Promotion of doctoral student mobility and concomitant alignment of different research programs and structures of different doctoral schools have become exceedingly difficult and has the potential to create many problems and unwanted strain for individual doctoral students and universities alike. This calls for further discussion about whether the PhD degree is, still, really a universal degree or if it has transformed into a culturally and regionally contextual educational phenomenon. Notwithstanding these distinctions, national and local priorities are not always aligned and the breadth of the doctoral experiences covered here, primarily those involving research doctorates, do not always transfer to professional doctorates that in some national contexts may often focus on more local priorities.

The point emerging from this paper is that understandings of global and local levels of doctoral education are deeply linked, as global drivers saturate local doctoral education and supervision practice. More in depth understandings is needed regarding how this is played out at local institutional levels and also if and how these local practices relate back to global and political levels of doctoral education. More specifically, further research about the following is required:

- a) how global trends, drivers, and strategies for doctoral education play out in local national settings and how such global drivers are integrated locally in specific teaching and learning environments at specific universities;

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- b) more awareness and discussion about the “universality” of the PhD degree. In an era where mobility regarding doctoral education policy is on the agenda, more attention should be given to what is actually possible to transfer across national arenas;
- c) what possibilities and challenges do the infrastructures of graduate schools bring with them in relation to doctoral education. We need to examine the everyday workings of graduate schools to learn more about what forms of organisation are at work within the broader higher education system.

This paper focused on six national sets of policies regarding research doctorates. It was beyond the scope of this paper to address the varied complexities of doctoral study in other nations. Without attending to all national and international trends, including those in Australia, New Zealand, and the Asian and African regions, the scope of this study is necessarily limited. We hope that our attempt to initiate these discussions will serve the purpose of highlighting what can only be thought of as a expanding area of study.

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Table 1

Summary of recent changes of doctoral education in Canada, Colombia, Denmark, Finland, UK and USA

<i>Driver</i> <i>Country</i>	<i>Massification</i>	<i>Professionalization</i>	<i>Quality Assurance</i>
<i>Canada</i>	<ul style="list-style-type: none"> <li>¥ aim to increase number of PhDs</li> <li>¥ poor employment outlook within academia</li> </ul>	<ul style="list-style-type: none"> <li>¥ funding for elite students and institutions</li> <li>¥ structuring doctoral fellowships to be in line with economic and social trends</li> <li>¥ emphasis on labor market ready skill acquisition, internships, and partnerships with industry/business</li> </ul>	
<i>Colombia</i>	<ul style="list-style-type: none"> <li>¥ investment in educating PhDs abroad to increase number of degree holders</li> <li>¥ rapid increase in the number of doctoral programs providing degrees</li> <li>¥ 150% increase in number of PhDs</li> </ul>	<ul style="list-style-type: none"> <li>¥ launching doctoral programs</li> <li>¥ increase in regulation and regulatory institutions</li> </ul>	<ul style="list-style-type: none"> <li>¥ defunding education</li> <li>¥ cutting permanent places for faculty</li> </ul>
<i>Denmark</i>	<ul style="list-style-type: none"> <li>¥ doubling the annual enrollment of doctoral students</li> </ul>	<ul style="list-style-type: none"> <li>¥ emphasizing learning of generic skills and interdisciplinarity</li> <li>¥ investing in developing teaching at the university</li> <li>¥ harmonizing doctoral degree according to European standards (i.e. third cycle of Bologna process)</li> <li>¥ launching graduate schools</li> </ul>	<ul style="list-style-type: none"> <li>¥ adopting benchmarking and ranking systems</li> </ul>
<i>Finland</i>	<ul style="list-style-type: none"> <li>¥ increase in number of doctoral degree holders</li> <li>¥ awarding universities for attracting international students completing the PhDs</li> </ul>	<ul style="list-style-type: none"> <li>¥ launching doctoral schools and programs</li> <li>¥ harmonizing doctoral degrees according to European standards (adopting Bologna qualifications)</li> <li>¥ introducing four stage researcher career model and tenure track system</li> <li>¥ launching international doctoral programs</li> </ul>	<ul style="list-style-type: none"> <li>¥ adopting benchmarking, and international evaluation systems</li> </ul>
<i>UK</i>	<ul style="list-style-type: none"> <li>¥ increase in number of doctoral students</li> <li>¥ development of professional doctorates</li> <li>¥ development of legislation and charters to address inequalities related to gender and race inequalities</li> </ul>	<ul style="list-style-type: none"> <li>¥ emphasis on training: in skills and competences</li> <li>¥ providing national funding for generic skills training</li> <li>¥ more structured preparation for PhD entry degree</li> <li>¥ contract researcher career system</li> </ul>	<ul style="list-style-type: none"> <li>¥ awarding national funding for PhD scholarships through networks of accredited doctoral training centres</li> <li>¥ stronger regulation of a host of doctoral education issues</li> </ul>
<i>USA</i>	<ul style="list-style-type: none"> <li>¥ increase in both professional and research doctorates</li> <li>¥ aim to increase number of PhDs amongst African American and Hispanic learners</li> </ul>	<ul style="list-style-type: none"> <li>¥ introducing professional doctorate degrees</li> <li>¥ emphasizing labor market ready skills also in the training of research doctorates</li> </ul>	<ul style="list-style-type: none"> <li>¥ defunding education</li> <li>¥ cutting permanent faculty</li> <li>¥ increasing contingent labor force</li> </ul>

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## Keypoints

The national, or local, meanings of doctoral education vary greatly.

We question whether the PhD degree is a universal degree or if it has transformed into a culturally and regionally contextual educational phenomenon.

Comparison among systems of doctoral education on the global level difficult and fraught with uncertainties and potential inequalities.

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